Thought, judgement and perception

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THOUGHT, JUDGMENT AND PERCEPTION*

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> Denke nie, gedacht zu haben! Wenn Du denkst Du denkst, dann denkst Du nur Du *denkst*. Denn das Denken der Gedanken, ist gedankenloses Denken. *(Never think you think. If you think you think, you only think you think. Thinking thought is thoughtless thinking.)*
>
> Chess players' tongue twister

In 2009 Reinhard Brandt published his book *Können Tiere Denken?* (*Can animals think?*). Quite rightly this work has played a leading role in recent discussions of the issue in German-speaking countries.[1] Two years earlier I had given my inaugural lecture at the University of Zurich with exactly the same title. In that lecture, however, and in some other publications, I have reached conclusions that in many—though not in all—respects run counter to those of Brandt. Concerning the question of the intellectual difference between human and non-human animals (the latter henceforth referred to simply as 'animals'), Brandt takes a moderate to emphatically differentialist line, whereas I am a moderate assimilationist. In particular I would argue that living beings without language are—at least in principle—capable of certain forms of thought.

However, despite the fact that I undoubtedly have my own opinions on many aspects of this topic, I shall in the following pages concern myself primarily with Brandt's book. In doing so I shall endeavour to take as my example Quine's disclaimer in his review of Strawson's *Introduction to Logical Theory*, namely that his purpose was not "to invoke [his own] philosophy in criticism of another man's book" (Quine 1953, 435). Nevertheless, for reasons of brevity I shall be compelled on occasion to refer to works of my own.

Taking Brandt's project as my starting point, I shall first discuss some methodological issues that arise from his appeal to Morgan's Canon, and then address his conception of thought as judgment. This involves a critique of his argument

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* This text is a translation by Joseph Swann of my original paper "Denken, Urteilen, Wahrnehmen".

1. Unless otherwise noted, all page references are to this work.

that the concept of *thought* should be restricted to *judgment*, and an exposition of the contrary thesis, namely that thinking involves more than judging. The next section will concentrate on the aspect of thinking that comes closest to Brandt's position, namely 'thinking *that* such and such is the case', or belief. Brandt disputes that animals are capable of belief. I disagree with his theses on this matter, which closely parallel Davidson's notoriously well-known arguments, and adduce two reasons in support of the opposite view, namely that animals possess knowledge and perception, and therefore also belief. Finally I shall consider Brandt's exposition of the relation between perception, differentiation and comparison. I shall attempt to show that his often behaviouristic conception of animal perception is both tactically and strategically at odds with his well-founded admission at other moments that some animals can make distinctions, and that their behaviour cannot be reduced to simple stimulus-response mechanisms.

1. *Brandt's project*

The question of the intellectual capacities of animals has for some time played a significant role in the English and French philosophical traditions. That it has now also come to the fore among German-speaking philosophers is above all thanks to the work of Perler, Wild (Perler, Wild 2005, Wild 2008) and Brandt. The fundamental issue in the present discussion is: 'Do at least some animals possess intelligence comparable with that of humans?' Brandt's book, however, starts from a somewhat more specific question: 'Can animals think?'

The answer to both questions is not just a matter of empirical observation, whether in the field or the laboratory, nor simply of biological theory, but also of how one understands disputed concepts like intelligence and thought. Both in general and at a more concrete level there is a fundamental difference here between two approaches. In the matter of mental capacities *differentialists* see significant qualitative (categoric) differences between animals and humans. *Assimilationists*, on the other hand, maintain that even these differences are purely quantitative: they see the relation between the intelligence of humans and of the higher animals as one of continuity.

Brandt represents a by and large moderate differentialism whose historical roots lie with Aristotle and Kant. He maintains that

- the *psyche* or soul is the seat of the ability to feel and perceive
- it is common to animals and humans (11–20)
- the *intellect*—and with it the ability to think—is a higher mental capacity proper to humans alone

- animals can 'ostensibly not think', which constitutes a 'gap between the human and the animal' (63)
- we can predicate of animals at most an *analogon rationis*, whose form and limits, however, we cannot determine (10).

2. *Methodological issues*

Brandt's agnostic caveats arise among other things from the fact that it is experimentally impossible to preclude the possession by animals of the brain structures required for thought (119). He confronts the overstated theses of many neuroscientists and philosophers with justified scepticism, observing quite rightly that the subject of psychological activity is not the brain alone but the whole animal or human being (14-15). Yet at this point he too seems to assign to neurophysiology an exaggerated importance.

The question whether animals can think etc. is not a matter of determining whether they possess 'those parts of the brain that are activated in human thinking' (11), but of determining what they do and what they perceive. The concepts we use at an everyday level, as well as in the behavioural sciences, are concerned not with genetic or neurological differences but with behavioural and perceptual abilities—i.e. phenomena in which *we humans* are interested in both our ordinary and scientific lives. It goes without saying that the use of such *well-established* concepts is not governed by inaccessible genetic or neurophysiological criteria, but by those of ordinary human intercourse—which means criteria that are at least in principle determinable through outward (i.e. publicly accessible) observation and experiment.

Thus we establish first of all whether a creature, for example, reacts to injury, perceives its surroundings, can use and make tools, recognizes itself in a mirror etc. Only then do we start investigating the neurophysiological structures and processes that might underlie such abilities. The *causal explanation* of mental qualities immediately involves the brain—and one step further back the genome—but the prior question whether mental capacities exist at all is another matter. The neurophysiological arguments of the assimilationists would be baseless in a world where the behaviour (including gestures and facial expression) of animals provided no evidence whatsoever of any criteria (e.g. intelligent planning) for the ascription of what we mean by mental capacity; or alternatively in a world that did provide such evidence, but in which the criteria were clearly not fulfilled. In the latter case one would have to conclude that the neurophysiological phenomena associated in humans with intelligent planning are not associated with analogous phenomena in animals—a conclusion that might be reinforced

by the observation that these phenomena belong contextually to central nervous systems that on the whole differ widely from those of humans.

Conversely, differentialist answers to Brandt's initial question are not immediately refuted by the evidence (whether evolutionary, genetic or neurophysiological) for biological continuity between animals and humans. Small genetic or neurophysiological differences may lead to major differences in mental capacity. Nor does evolutionary continuity imply that currently existing species share our mental abilities.

Despite the neurophysiologically motivated agnosticism mentioned above, Brandt's differentialism is by and large based on philosophical arguments independent of any agnosticism. He maintains for conceptual reasons that the ability to think is bound indissolubly to language. Only those creatures can form a judgment that are capable in principle of articulating that judgment in language—a position I have called 'lingualism', and one that in relation to the question 'Can animals think?' gives rise to more problems than it solves. Do some animals possess linguistic abilities? If so, what sort of abilities are they, and what implications do they have for the intellectual capacities of these animals?

Unfortunately Brandt does not give this matter the rigorous attention it deserves. He simply denies the linguistic ability of parrots (31, 35), as if Pepperberg's (2009) Alex studies had never taken place. This is a shame, since his linking of thought with judgment gives rise to an extremely interesting question that has so far been neglected in animal language research, namely what sort of affirmation and negation is contained in the symbolic systems acquired by acculturated primates, marine mammals and parrots. Brandt denies outright the possibility of negation in animal language (57f., cf. also 81f., 135-6)—a position that at least calls for substantiation if one considers that Yerkish, an artificial language learnt by primates, contains signs for affirmation and negation, albeit with reference to a whole sentence, and that marine mammals can operate so-called 'Yes and No paddles' (Hermann, Forestell 1985, 667–91; Pepperberg 2000, 83).[2]

A final methodological point before turning to the core theses of Brandt's book is his recourse to the principle of economy. Brandt concedes to the assimilationists that the explanation of animal behaviour through an appeal to 'thinking activity' is 'pragmatically convincing, […] practised with success, and […] empirically irrefutable' (62); but at the same time he places the burden of proof firmly in his opponents' camp. For, in line with the principle of economy in general and *Morgan's canon* (a golden rule of comparative behavioural studies)

2. On the question whether judgments require internal negation cf. Gerson Reuter's article in the present volume.

in particular, mental attributes may only be predicated of animals if it is the *only possible* explanation of their behaviour (71, 76, 93).

But the golden rule to be applied in this case is not so much the principle of economy as that of *plausibility*. The value of parsimony must be weighed against that of other methodological principles such as explanatory power, simplicity, precision, practicability etc. (cf. Glock 2009, 236). The assumption that purposeful intelligent behaviour can be explained in animals, as in humans, by an appeal to beliefs, wishes, intentions and the like is at all events preferable to the—in Brandt's own words 'somewhat unhappy' (122)—postulate of an undetermined and perhaps indeterminable *analogon rationis*. Nor is simple associative learning an acceptable ready-made option for the differentialist seeking to explain intelligent behaviour. On the contrary, it must be demonstrated in the concrete instance that parsimonious explanations of this kind are actually more plausible than alternatives involving more complex cognitive performances. These latter are at all events preferable in cases where there is no evidence of any opportunity for associative learning on the part of the subject.

Finally it is worth noting in this context that the law of parsimony is a two-edged sword. It can also be invoked in support of a unified explanation of analogous behaviour in humans and animals. And in one respect Brandt does precisely this, when he appeals to the principle of economy to postulate an assimilationist explanation of the human and animal faculty of spatial orientation (cf. his essay in this volume). But a methodology that is good in the one case must also be good in the other—with regard to the faculty of discrimination, planning, or the production and use of tools etc. Of course these activities present difficulties of their own, above all the question whether they are *really analogous* in humans and animals. But economy or simplicity of explanation does not *per se* constitute an argument for differentialism.

3. *Brandt's concept of thought as judgment*

Brandt proposes a concept of thinking that equates it with the activity of *judging*. He sees thought as "a mental capacity to form judgments that we only know with certainty to exist in humans". What counts here is "only those mental acts [that] reveal the structure of affirmation or negation: 'S is P, S is not P'" (9, 29f.).

This concept of judgment, however, is open to objection, a fact of which Brandt is fully aware and which he tackles with a rhetorical question: Does this definition not beg the question whether animals can think? Putting this in more general terms one can ask: Doesn't the equation of thought with judgment bypass

entirely the normal concept of thinking and with it the normal understanding of Brandt's opening question?

Brandt believes he can show that to equate thought with judgment is not a mere stipulation, nor does it beg the question. In order to safeguard his position he adduces a classically elenctic argument:

> We seek to introduce a uniform (and not specifically biological, philosophical, or computer technical) concept of thought by basing our argument on the thinking and judgment that is employed by everyone who speaks about thinking. And this is the very same activity of thinking that is performed when our thesis is disputed: in other words the opponent is immediately caught in self-contradiction. (29)

But this argument is based on an equivocation with respect to the phrase "thinking […] that is employed by everyone who speaks about thinking". What is it exactly that Brandt sees as an insuperable obstacle for the opponents of his concept of thought as judgment?

- Either it is a matter of the *concept* of thought ordinary people *use* when they talk about thinking;
- or it is a matter of the *type* of thought ordinary people *perform* when they talk about thinking.

Let us take the first option first: the ordinary concept of thought. This concept expresses an understanding of thought that can be abandoned in favour of another concept without self-contradiction. But it is a concept that can and should at least constitute the starting point of a conceptual investigation. This ordinary, well-established concept of thought is, however, not identical with the concept of judgment. I shall develop this point further in section IV.

The second option immediately involves us in thinking about thinking. Here thought may very well be equivalent to judgment and the use of concepts; for to talk about thinking is to use concepts and to perform an act of judgment in both the logical and ordinary sense of forming a considered utterance. But such meta-thinkers do not incur self-contradiction if they do not themselves identify thought with judgment.

There is *no contradiction* in employing a concept of thought when one is talking about thinking that *does not apply solely* to the particular type of thinking one is at that moment performing. Nor is there any inconsistency in maintaining that the concept of judgment covers thinking *about thinking* but does not cover *everything* that passes for thinking. *No contradiction* would arise even if

one were to *employ* a concept of thought that *did not apply at all* to the mental operations one was at that moment performing. Contradiction would only arise if one were to *apply* such a concept to those operations—i.e. if one were to apply precisely to talking and/or thinking about thinking a concept of thought that did not *in this case* apply.

Let me illustrate the problem of Brandt's argumentation with two analogies. Is there a concept of happiness that necessarily underlies all discussion of that subject? Even if there were, it would not necessarily be restricted in its scope to the happiness we experience when we talk about happiness. One may of course object that to talk about happiness one does not have to be happy, but to talk about thinking one does have to think.

My second analogy avoids this dilemma: it refers to the concept of 'speech act'. For to speak of a speech act is necessarily to perform a speech act. But does this mean that the concept of speech act one thereby uses must be such as to apply exclusively to the type of speech act one is at that moment performing—namely assertoric speech acts? That can hardly be the case, for if it were, it would exclude (among other things) both questions and commands, which are quite obviously speech acts as well.

4. *Thinking—'a widely ramified concept'*

The attempt to establish the equation of thought with judgment as an irrefutable and inescapable axiom for all thinking about thinking has, therefore, failed. As Wittgenstein so succinctly put it, 'Thinking' is a 'widely ramified concept' (*Z* 110). In the present context one must distinguish three forms:

- to think *of* something—e.g. the cup of tea on my desk;
- to think *about* a problem—e.g. with a view to drawing a theoretical or practical conclusion;
- to think/believe *that* …

This last form amounts to harbouring a belief. It can be expressed in the formula '*a* thinks/believes that *p*', (or in abbreviated form '*a*T*p*'), where '*a*' stands for the subject and 'that *p*' stands for the content of what '*a*' thinks. (The common malpractice of referring to the subject as a thinker assimilates him or her to the *penseur* absorbed in thinking about a problem)

For Brandt it should actually be indisputable that animals can think *of* something, for he not only laudably emphasises the phenomenon of attention paying, but also quite rightly observes that animals can concentrate on things (objects,

persons, tasks or qualities)—i.e. they can devote their entire attention to them (95f.).[3] If that is the case, it follows that they can think of these things, for the statement '*a* is concentrating on *x* but *a* is not thinking of *x*' is nonsensical.[4] The only open question is what sort of animals think of what sort of things—whether animals can, for example, think of things beyond their immediate perceptual horizon.

But what about the second form of thinking? Thinking *about* something can initially at least be understood as the process that underlies intelligent problem-solving. And intelligence is—again broadly speaking—the capacity to solve newly encountered problems in a flexible and appropriate way. This is not, in humans, bound inextricably to a sequence of inner judgments. Pace Plato, an inner monologue is neither necessary nor sufficient for thinking about something (cf. Ryle 1949, Glock 1997). Associative and image-centred thought often plays a decisive role in this activity, and often enough, too, there is no answer as to what exactly passed through one's mind while one was thinking about the problem in question.

Flexible, intelligent problem-solving, however, is something of which higher animals are capable. The behaviour of primates in this respect is similar to our own in its procedures, as well as in the gestures and facial expressions involved. We may conclude, therefore, that there is no reason either to equate thinking with judgment or to deny it of animals.

5. *Thinking* that *and belief*

In many passages, however, Brandt modifies his identification thesis, saying, for instance, that judgment constitutes 'the core of thought' (33). The question arises, therefore, whether at least 'thinking *that*' is identical with judgment, and is so in a way that excludes animals.

Brandt's argument for this position can be summarized as follows:

- P_1 All 'thinking *that*' entails judgment
- P_2 Judgment presupposes the possession of a concept
- P_3 Animals do not possess concepts

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3. But he continuously falls into a behaviourist idiom, speaking of stimuli rather than objects etc. For a critique of this cf. VIII *Perception and Differentiation*.

4. In the discussion at the book symposion in Frankfurt it was asserted that one can concentrate on something without thinking of it. This would seem to refer to the meditative fixing of visual attention on the object in question. But either that is not a case of concentration on the object—because the mind is emptied—or 'thinking of' is implied at some point.

- C_1 Animals cannot form a judgment
- C_2 Animals cannot 'think *that*'.

P_2 is to be recommended as a terminological proposition: it makes good historical and taxonomic sense to restrict the concept of judgment to those judgments that involve concepts. But if one accepts this terminology, at least one of the premises P_1 or P_3 is false. For this reason the argument is invalid. Furthermore, conclusion C_1 is in fact false, and so is C_2. In what follows I shall attempt to show why (cf. also Glock 2009).

With C_2 Brandt accedes to Aristotle's and Davidson's denial that animals can possess beliefs or opinions, for each of these mental states entails articulation in the form of a judgment (e.g. 91). Despite his illustrious predecessors, Brandt's thesis is, however, open to objection. It implies that Malcolm's by now famous dog does not (falsely) think that the cat is in the tree up which he is assiduously barking, nor does the chimpanzee think that the M&Ms are in the container she has opted for in a forced choice test etc. etc.

Brandt nevertheless considers C_2 to be unproblematic:

> Can animals be convinced of something, can they believe it without knowing it precisely? That can only be the case if they can recognize the distinctions between these states, which is hardly likely. (46)

This latter assertion is challenged by some assimilationists who, on the basis of *wager game* experiments with apes, maintain that these animals possess a degree of self-referential meta-cognition (Kornell et. al. 2007, cf. also Esken 2012). My own inclination is to agree with Brandt in this matter. But this does not alter the fact that his argument—like Davidson's parallel claims—is a non-sequitur. It does not follow from the fact that *a* does not recognize the distinction between *F* and *G* that *a* cannot *be F* or *G*. Thus *a* is not invulnerable to a malignant tumour simply because *a* does not know the difference between malignant and benign tumours.

In the matter of knowledge versus belief—or of true versus false beliefs—one can, of course, à la Davidson, attempt to show that there are special reasons why such knowledge or truth can only be predicated of *a* if *a* can make the distinction in question and is in possession of the corresponding concepts. Brandt, too, seems to rely implicitly on an argument of this kind, as he repeatedly denies that animals can have mental states that are true or false, or in other words that they can be wrong (71, 81, 89, 115). But, as far as I can see, he stops short of arguing the case explicitly; so I will briefly outline Davidson's position, which may be taken to fill the gap.

Davidson's argument runs as follows:

i. $a\mathrm{T}p \Rightarrow a$ can *be wrong* in thinking that p
ii. $a\mathrm{T}p \Rightarrow a$ can *realize* that a is wrong in thinking that p
iii. $a\mathrm{T}p \Rightarrow a$ possesses the *concept* of error
iv. $a\mathrm{T}p \Rightarrow a$ possesses the concept of (erroneous) *belief*

If one accepts that the animal meta-cognition mentioned above is not only real but also conceptual in nature, one will be able to accept (iv) without being bound to either C_1 or C_2. But a more plausible position would be to challenge (iii) by regarding the self-referential meta-cognition as non-conceptual. Independently of the assumption of meta-cognition, however, (ii) is already misleading inasmuch as it posits second order beliefs. *a* can manifest error by showing signs of surprise or disappointment, or by an alteration in behaviour, and a mere change of belief can lead *a* from the false belief 'that *p*' to the true belief 'that not *p*' (for a more detailed version of this critique of Davidson see Glock 2000, 54-6).

6. *Belief and knowledge*

So far I have confined myself to refuting Brandt's objections against the possession by animals of the ability to think *that*. But there are also two *positive* reasons for thinking that animals have beliefs.

The first follows from the connection between belief and knowledge. Animals are capable of *knowledge-that*, a proposition which Brandt—contra Davidson—expressly accepts. Like us, dogs know "they cannot walk on water" (7). But in order to know something, a subject must have appropriate beliefs. Knowledge and belief go hand in hand; or to put it more precisely, the concept of belief must be available as a *fallback* position to characterize the epistemic situation of a subject who exercises cognitive faculties but without attaining knowledge.

Even if knowledge does not in every case involve belief (pace its traditional equation with true and justified belief), the *ability* to know presupposes the *ability* to believe. There is nothing sensational about this statement. Like humans, animals can *err*. Assuming the appropriate wishes and intentions, this manifests itself above all in situations where an animal's behaviour shows it to be led by its senses but in an inappropriate way. The possibility and circumstances of animal error have, in fact, been just as richly documented in ethological observations and experiments as the possibility and circumstances of animal knowledge.

7. *Conviction and perception*

A second argument for the possibility that animals possess beliefs is closely allied to the first. It is based on the most fundamental and important of all cognitive abilities, that of perception. Animals can *perceive* their physical and social environment in many different ways. It is important for my argument that such perception is not confined to objects or persons; that is to say it takes not only the form '*A* perceives *X*', where *X* is a snake or shotgun report etc., but also the form '*A* perceives *that p*'.

This conclusion derives from the connection between perception and behaviour. Complex animal behaviour cannot be explained merely in terms of the perception of objects; it entails the perception of facts and contexts. Take, for example, the dog that has learnt not to take his bone when this is lying on the table but only when it is lying in his bowl. The dog's behaviour cannot be explained simply in terms of his perceiving discrete objects. It can only be explained in terms of the following opposition:

- the dog sees at time t_1 that bone is on table
- the dog sees at time t_2 that bone is in bowl.

Why? Because at both t_1 and t_2 the dog can see the bone, table and bowl. So perception of the conglomeration formed by these three objects cannot explain the difference in its behaviour at t_1 and t_2.

But, it might be objected, this behaviour can be explained behaviouristically. We only need to posit the following contrast

- stimulus: 'bone on the table'—reaction: 'do not take'
- stimulus: 'bone in the bowl'—reaction: 'take'.

But what sort of stimulus is this? Is it purely proximal and physiological, like the pain stimulus to which even an oyster will react? This behaviouristic fairytale ignores the distinction between lower animals and higher ones like dogs, dolphins or primates, which possess a range of different sense organs and corresponding sensory centres in the brain. And primates at least score well in the standard tests for object permanence and object identification in line with Piaget (Seed, Tomasello 2010, 409).

The alternative is to admit that the reaction in question is not just to a proximal stimulus but to perceived information. But how can this information be specified if not as a perceived *fact*? An apparent way out of this dilemma for the differentialists might be as follows: what the dog perceives is not *that* the bone is

on the table or in the bowl; what he perceives is *'bone on table'* or *'bone in bowl'*. But this is not really a way out. For either the determinants 'on the table' and 'in the bowl' are used *restrictively*, to indicate *which* bone the dog perceives—but this would not explain the divergent behaviour of the dog, which perceives the *same* bone at t_1 and t_2. Or, alternatively, they are used as ellipses for 'lying on the table' and 'lying in the bowl', which would explain the divergent behaviour of the dog. But to perceive the bone *as* lying in the bowl is simply to perceive *that* the bone is lying in the bowl by another name. One way or another the dog's behaviour can only be explained on the hypothesis of factual perception, perception *that*.

Having established this, I come now to the second step in my argument, which pays due deference to the English phrase *seeing is believing*:

From the proposition '*a* sees *that p*' (the sun is shining etc.) we may conclude either '*a* knows *that p*' (where 'seeing' is used factively) or '*a* believes *that p*' (where it is used non-factively). But both 'knowing *that p*' and 'believing *that p*' are cases of 'thinking *that p*' in the sense that is relevant here. It follows that Brandt's initial P_2 is false. This confronts him with a dilemma. For

- either all beings able to 'perceive *that*' are also able to form judgments and concepts, in which case P_3 is false, for all of these animals will then possess concepts (albeit not *our* concepts)
- or P_1 is false, because 'thinking *that*' (i.e. holding a belief) is possible without either a judgment or concept.

I would plead for the abandonment of P_3, but that is another story, told in another article (Glock 2010).

8. *Perception and differentiation*

Brandt is in many respects a moderate differentialist, not least, for example, in the restrained and sensitive way in which he addresses the issue of animal consciousness. Here he provides a positive antidote to the widespread hysteria that, especially in the English-speaking world, appears to greet the treatment of so-called qualia (cf. Glock 2011). That animals are endowed with sentience and sense perception, and that higher animals are, through their senses, aware of their physical and social environment should really be uncontroversial. Yet it is challenged by a style of thought that takes consciousness to be not so much a mental capacity as a mysterious inner glow beyond the reach of any evidence concerning either language or behaviour.

On the other hand, so far as the distinction between sense perception and thought, and in particular sense perception and judgment is concerned, Brandt at least in one respect goes even further than the radical differentialists. For in contrast to these—even to Davidson—he at times denies animals the ability not only of conceptual classification or categorization but also of *differentiation* (66, 71f., 81).

Such denial is prima facie paradoxical, or at least highly implausible, for it is based in Brandt's text in the first instance on the equation of differentiation with *explicit judgments of comparison* (69-70). This, however, is an unjustified intellectualization. For differentiation does not require any sort of monologue, either exterior or interior, but only the ability to perceive that object *x* is *F* and object *y* is not *F*, or that *x* is *F* and *y* is *G*. It does not even require that an *F* be perceived *as F*. That animals possess the ability to make distinctions of this sort is not only obvious to the common-sense observer; it has been thoroughly demonstrated in many scientific investigations and experiments. Animals have shown themselves able, both in the laboratory and in the wild, to distinguish many different colours, flavours, sounds, forms, materials, quantities, other creatures etc. Moreover, many of these abilities are not innate but learnt. (Tomasello, Call 2010, cap. 4–5; Herrnstein, Loveland, Cable 1976, 285–302)

However, there is another, less immediate reason for Brandt's denial that animals are able to differentiate. This is evident at certain points where he reveals a markedly reductionist attitude to animal perception, which he assimilates not only to sensation but to the mechanical reactions of bicycles and compass needles (67, 71, 116f.). Against such reductionism it is important to distinguish between the following:

- differential reactions of inanimate objects to external causal influences
- differential reactions of animate but non-sensient organisms in order to meet their needs
- mental but non-cognitive reactions like that of an oyster to a noxious stimulus
- differentiation or discrimination based on perception, as found in higher animals with refined sense organs
- classification based on conceptualization.

Brandt's Aristotelian heritage should be reason enough for him to accept such a hierarchy. But instead of doing so he once again defends his—in this instance behaviouristically tinged—differentialism with an argument from economy. The example he takes is that of the butterfly that seems to differentiate between red and green because it reacts differently to these two colours. But why, Brandt

asks, should this not simply be a case of a 'single colour signal' acting purely mechanically on the insect (72)? My answer is, because the butterfly can see various *different* colours at the same time (we know this not only from its behaviour but also from the neurophysiology of its optical apparatus) and can react *differently* to these colour differences—in accordance with the information provided by its sense organs. Higher animals—again in accordance with the information transmitted by their various (and variously refined) senses and the knowledge these provide of other relevant environmental aspects—can react with differential behaviour in one situation to the difference between red and green, while disregarding that difference in another situation.

Intelligent mammals and birds display complex behaviours that are relatively independent of stimuli of any sort. Far from always reacting automatically or mechanically in the same way to the same stimulus, they act purposefully to achieve a specific goal and can modify their behaviour in complex and flexible ways that depend on the goal and on their sense perceptions. In this respect highly intelligent animals may even reveal something that approaches reflection or planning (cf. Glock 2005, 179–82; 2009, 2457–50???).

This last assumption might seem to go too far in the direction of assimilationism. Nevertheless we can at least note that there is no reason to suppose that animals live in a world of proximal neural stimuli that is ontologically different from our perceived world of distal objects. The counter-assumption leads in Brandt's book to inconsistencies and tensions at both the tactical and strategic level.

Tactically, it is striking that Brandt is unable to maintain his denial that animals can differentiate. Thus he concedes them the ability to "distinguish between stationary and moving objects" (73, cf. also 65); and he concedes them 'individual identification'—i.e. the ability to differentiate between individual things or organisms (107). Finally he admits that they are capable of attention and concentration and can 'select' specific stimuli (95ff.). How any of this can be the case without the ability to distinguish between specific objects or qualities remains a mystery to me.

As to the strategic level, I would first point out that it is not necessary to deny animals the ability to differentiate in order to question their ability to think in the sense of making conceptual judgments. Speaking more generally, in the third part of his book Brandt continuously counters assimilationist assertions by reducing animal behaviour to mechanical patterns of stimulus and response, thereby annulling the broadly Aristotelian distinction between mentally gifted animals and mere mechanisms that marks the first part of the book. We would be well advised, I think, to forego this reductionism and hold Brandt to his concession of genuinely mental phenomena in animals.

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